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# *Grahamina*, a new genus for robust-bodied triplefins (Teleostei: Tripterygiidae) from New Zealand and Australia, with description of a new species

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With 9 figures

Summary

A **new genus,** *Grahamina*, is described for New Zealand and Tasmanian species of estuarine and robust triplefins, characterized by lacking serrations on the posterodorsal margin of the posttemporal bone, lacking hypural 5, 5–8 spines in the first dorsal fin, a divided lateral line, head scalation usually lost, a bully head and a robust body. It contains four species: *G. nigripenne* (Valenciennes in Cuvier & Valenciennes, 1836) (New Zealand including Chatham Islands; fresh and brackish water); *G. capito* (Jenyns, 1841) (New Zealand including Chatham, Auckland and Antipodes Islands; sheltered marine intertidal and subtidal areas); *G. signata* **n. sp.** (New Zealand including Chatham and Antipodes Islands; exposed marine intertidal and subtidal areas); *G. gymnota* (Scott, 1977) (Tasmania; estuaries). *Trypterigium robustum* Clarke, 1879 is **synonymized** with *Forsterygion varium* (Forster in Bloch & Schneider, 1801); a **lectotype** is designated for *Tripterygium jenningsi* Hutton, 1879, a nominal species now synonymized with *Grahamina capito*. The species of *Grahamina* are described on the basis of 2080 specimens; a key to the species of the genus is presented.

Keywords: New genus; new species; Tripterygiidae; New Zealand; Tasmania.

Zusammenfassung

Die **neue Gattung** *Grahamina* wird für eine Gruppe häufiger neuseeländischer und tasmanischer Dreiflossiger Schleimfische beschrieben. Sie ist durch das Fehlen posterodorsaler Dornen auf dem Posttemporalknochen charakterisiert, das Fehlen des Hypuralknochens 5, das Fehlen der Beschuppung am Kopf und unterhalb der ersten Rückenflosse, 5–8 Stachelstrahlen in der ersten Rückenflosse, eine geteilte Seitenlinie, und den breiten Kopf und Körper. *Grahamina* n. gen. enthält vier Arten mit teilweise sehr variablen Merkmalen: *G. nigripenne* (Valenciennes in Cuvier & Valenciennes, 1836) (Neuseeland und Chatham-Inseln; Süß- und Brackwasser der Flußunterläufe, Bäche und Ästuare sowie Süßwasserschicht im Fjordland und in den Marlborough Sounds); *G. capito* (Jenyns, 1841) (Neuseeland und Chatham-, Auckland- und Antipoden-Inseln; ruhige marine Gezeitentümpel und oberer Sublitoralbereich); *G. signata* **n. sp.** (Neuseeland, Chatham- und Antipoden-Inseln; exponierte marine Gezeitentümpel und oberer Sublitoralbereich); *G. gymnota* (Scott, 1977) (Südost-Tas-

manien: Ästuare). *Trypterigium robustum* Clarke, 1879 wird mit *Forsterygion varium* (Forster in Bloch & Schneider, 1801) **synonymiert**; für *Tripterygium jenningsi* Hutton, 1879, eine nominelle Art, deren Name ein jüngeres Synonym von *Grahamina capito* ist, wird ein **Lektotypus** designiert. Die Arten der Gattung *Grahamina* werden anhand von 2080 Exemplaren beschrieben und abgebildet; außerdem wird ein Bestimmungsschlüssel für Arten der Gattung *Grahamina* entworfen.

Contents



## 1. Introduction

Tripterygiid fishes (triplefins) are a family of small bottom living fishes of cold, temperate, subtropical and tropical sea shores and offshore islands usually associated with hard substrates occurring most commonly in the intertidal and shallow subtidal zones, but some extend to at least 500 m depth. There is a worldwide total of about 30 genera and at least 130 valid species known, with many of these species living in the Indo-West Pacific region.

An area with an especially large number of endemic triplefin genera and species is New Zealand which has 12 genera (9 endemic) containing about 27 species (25 endemic). The intertidal and upper subtidal zones are especially rich in triplefins (Paulin & Roberts, 1993; pers. obs.). The dominant elements in sheltered intertidal and subtidal fringe habitats are two species of *Bellapiscis* (*B. medius* and *B. lesleyae*), a species of *Forsterygion* (*F. lapillum*), and a species in the "robust triplefin" complex.

In extremely exposed intertidal and subtidal fringe habitats, the most common fishes are the Giant Triplefin, *Blennodon dorsale,* and second species of "robust triplefin". In estuaries and freshwater areas, especially in the freshwater layers of southwestern Fiordland and Marlborough Sounds and upper reaches of rivers, "estuarine triplefins" are abundant which also have a robust appearance.

From southeastern Tasmania, a species similar to New Zealand etuarine and robust triplefins was described under the name *Forsterygion gymnotum* by Scott (1977), who demonstrated that Tasmania and New Zealand have faunal elements in common.

Recent authors have referred robust and estuarine triplefins to the genus *Forsterygion*. Paulin et alii (1989) keyed the estuarine triplefin *Forsterygion* sp., and listed four other robust-type species with uncertain identities: *"Tripterygion" capito, "T." jenningsi, "T." nigripinnis,* and *"T." robustum*. Paulin & Roberts (1992: 91–94) included two robust-type noting each comprised a poorly understood species complex, provisionally placed in *Forsterygion*: an "undetermined estuarine triplefin" *Forsterygion ?nigripenne,* and an "undetermined robust troplefin" *Forsterygion*

*?robustum*. HARDY (1989), however, excluded the complex of estuarine / robust triplefins from the genus *Forsterygion*, as they did not share the synapomorphy of that genus, a posterodorsally serrated posttemporal bone, but he was uncertain about their validity and generic affinity.

During a revisionary study of Australian, New Zealand and southwest Pacific triplefins, efforts were made to assign valid names to species of this group of estuarine / robust triplefins.

The first step was to find the identity of several of the older names of the "*Forsterygion*-complex". While types could be located for *Tripterygion nigripenne* Valenciennes in Cuvier & Valenciennes, 1836, *Tripterygion capito* Jenyns, 1841, and *Tripterygium jenningsi* Hutton, 1879, the type of *Trypterigium robustum* Clarke, 1879 is lost. As a result of a 1992 collecting trip to Jackson Bay, New Zealand's South-Westland, the type locality of *T. robustum*, that species is synonymized with *Forsterygion varium*.

The second step was to distinguish populations of the estuarine / robust triplefin complex at the species level. It contains four species, some of them highly variable: *T. capito*, a species inhabiting sheltered, marine intertidal and upper subtidal areas (with *T. jenningsi* as a synonym); *T. nigripenne*, inhabiting fresh water and estuaries; another, undescribed species, living in extremely exposed intertidal and upper subtidal habitats; *F. gymnotum* of southeastern Tasmanian estuaries.

The third step was to solve the generic relationships of the estuarine / robust triplefin species. They are assigned to a new genus in the present paper, which is distinct from *Forsterygion* and other related genera, but cannot be defined by synapomorphies at the present state of knowledge.

## 2. Methods, materials and acknowledgments

Methods: Counts and measurements (with dial calipers point to point in a straight line) were made following the methods of HUBBS & LAGLER (1958, 1964), and as modified by FRICKE (1983) for counting caudal fin rays.

The posttemporal lateral line branch is classified as either I-shaped (mostly straight) or U-shaped (deeply curved around the base of the first dorsal fin) according to HANSEN (1986). The mandibular pore formula gives the number of pores under left dentary + number of median pore(s) + number of pores under right dentary (e. g. 3 + 1 + 3). Proportions are expressed in thousands of standard length (SL). In the descriptions of new species, the proportional data of the paratypes follow those of the holotype, in parentheses, e. g. 135 (132–140). As the starting point for several lengths, the middle of the upper lip is used rather than the tip of the upper jaw, as the latter is protractile.

Materials: The specimens described in the present paper are deposited in the following institutions as defined by LEVITON et alii (1985):

*AMS* The Australian Museum, Sydney;
*BMNH* The Natural History Museum, London [formerly British Museum (Natural History)];
*CAS* California Academy of Sciences, San Francisco;
*CMC* Canterbury Museum, Christchurch, New Zealand;
*CSIRO* IAN S. R. MUNRO Ichthyological Collection, Commonwealth Scientific and Industrial Research Organization, Division of Fisheries Research, Hobart, Tasmania, Australia (formerly at Cronulla, New South Wales);
*MNHN* Muséum National d'Histoire Naturelle, Paris;
*NMNZ* Museum of New Zealand Te Papa Tongarewa, Wellington (formerly Dominion Museum, then National Museum of New Zealand);
*OM* Otago Museum, Dunedin;

*QVMT* Queen Victoria Museum and Art Gallery, Launceston, Tasmania, Australia;
*SMF* Forschungsinstitut Senckenberg, Frankfurt/Main;
*SMNS* Staatliches Museum für Naturkunde in Stuttgart;
*TMH* Tasmanian Museum, Hobart;
*USNM* National Museum of Natural History, Smithsonian Institution, Washington D.C.;
*ZMUC* Zoologisk Museum, University of Copenhagen.

For the osteological comparisons, the following cleared-and-stained material of the genus *Grahamina* was used (additional to numerous C & S specimens of other genera):

*G. capito*: NMNZ P.13975, 3 spec., New Zealand, North Island, Scorching Bay, Wellington Harbour. – NMNZ P.17083, 7 spec., Antipodes Islands. – NMNZ P.20111, 1 spec., Auckland Islands. – NMNZ P.20112, 3 spec., Auckland Islands.

*G. gymnota*: NMNZ P.25423, 2 spec., Tasmania, Kethering Jetty.

*G. nigripenne*: NMNZ P.14974, 3 spec., New Zealand, South Island, Kaikoura. – NMNZ P.15244, 3 spec., New Zealand, North Island, Oakura Bay. – NMNZ P.15303, 4 spec., New Zealand, North Island, Te Haumi Bay. – NMNZ P.15252, 8 spec., New Zealand, North Island, Peka Peka Bay. – NMNZ P.16958, 2 spec., New Zealand, South Island, Fiordland. – NMNZ P.30571, 1 spec., New Zealand, South Island, Waitati River mouth.

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## 3. Systematics

### 3.1. *Grahamina* new genus

*Tripterygion* (non Risso, 1826): Valenciennes in Cuvier & Valenciennes, 1836: 413. Jenyns, 1841: 94. Richardson, 1843: 212. Gill, 1893: 119. Waite, 1909: 597. Waite 1913: 7. Paulin & Stewart, 1985: 51. Hardy, 1989: 491.

*Tripterygium* (non Risso, 1826): Günther, 1861: 277. Hutton, 1872: 31. Hutton, 1879: 339.

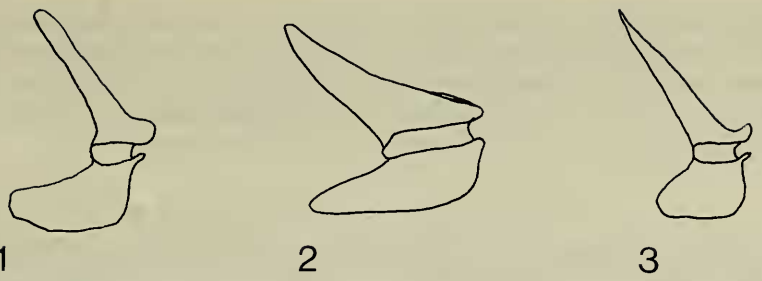
*Enneapterygius* (non Rüppell, 1835): Rendahl, 1926: 10, 11.

*Forsterygion* (non Whitley & Phillipps, 1939): Anderson, 1973: 3, 99. Scott, 1977: 158. Last, Scott & Talbot, 1983: 428. Paulin & Roberts, 1992: 93.

Type species: *Grahamina nigripenne* (Valenciennes in Cuvier & Valenciennes, 1836).

#### Etymology

This new genus is named for Graham Hardy, in appreciation of his revisionary work on New Zealand Tripterygiidae. Graham recognized this new genus, but did not publish a description. Gender feminine.




Figs 1–3. Posttemporal bone of species of *Grahamina* new genus. – 1. *Grahamina capito*; – 2. *Grahamina gymnota*; – 3. *Grahamina nigripenne*.

## Diagnosis

First dorsal fin with 5–8 spines; anal fin with 1–2 spines and 21–29 rays; pelvic fin with 1 spine, 2 rays; lateral line discontinuous; scalation below first dorsal fin base present or absent; posterodorsal margin of posttemporal smooth; 0–2 pterygiophores between bases of second and third dorsal fins; hypural 5 absent.

## Description

First dorsal fin with 5–8 spines, second dorsal fin with 16–24 spines, third dorsal fin with 11–17 rays (the last divided at its base); anal fin with 1–2 spines and 21–29 rays (last divided at its base); pelvic fin with 1 spine, 2 rays, without an asssociated median element. Lateral line discontinuous, with both tubular and notched scales. Head and nape scalation usually lost (only in some specimens of *Grahamina capito* present). Posttemporal lateral line branch U-shaped.

Infraorbitals 5–6. Vomer and palatines with a patch of small teeth. Both jaws with a row of sharp, recurved teeth, and an inner pad of smaller, villiform teeth. No lateral flange on metapterygoid. Total vertebrae 44–50 (12–16 abdominal vertebrae). Posterodorsal margin of posttemporal smooth (Figs 1–3). None, one or two pectoral fin rays insert on an extension of the scapula. Epihyal/ceratohyal fusion both medial and lateral. 0–2 free pterygiophores between bases of second and third dorsal fins. 2 epurals. Hypural 5 absent.

## Remarks

The genus *Grahamina* n. gen. consists of a complex of closely related intertidal and upper subtidal species of robust, bully-headed triplefins. They share the lack of serration on the posterodorsal margin of the posttemporal bone, which is probably a symplesiomorphic character (but plesiomorphy or apomorphy is hard to judge).

Unfortunately, although it is easy to separate *Grahamina* visually from the similar genus *Forsterygion*, it is virtually impossible to separate them osteologically, as both are very generalized. Species in the genus share a few symplesiomorphies, but no unique synapomorphy is known. It is virtually impossible at present to separate the genera on the basis of osteological synapomorphies. The only synapomorphy of *Grahamina* would be the loss of the head and nape scalation; this is shared, however, by two species of the genus *Forsterygion* (see below).

The case is further complicated by the fact that *Forsterygion* species have the margin of the posttemporal serrated, but one species, *Forsterygion* sp. (yellow-black

triplefin; a sister species of *Forsterygion lapillum*) has not, which is most probably a secondary loss of the character and thus an apomorphy. *Forsterygion lapillum* and *F.* sp. also have a loss of the head scalation in common with *Grahamina,* which is probably due to the very similar habitat of *Forsterygion lapillum* and some *Grahamina* species, which are specialized to live in intertidal areas.

### 3.2. Key to species of *Grahamina*

1a Anterior lateral line series with 13–16 tubular pored scales; first dorsal fin high, often as high as second dorsal fin; second dorsal fin distally dark gray, basally light . . . . . ***Grahamina nigripenne***

1b Anterior lateral line series with 17–26 tubular pored scales; first dorsal fin low, much lower than second dorsal fin; second dorsal fin usually not distally dark gray; if distally dark gray, basally also dark gray . . . . . 2

2a Supraorbital tentacle with 6–10 branches, the middle branch longest . . . . . 3

2b Supraorbital tentacle with 2–4 branches, the anterior branch longest . . . . . 4

3a Posterior lateral line with 10–15 basally pored scales; supraorbital tentacle with (3–)6–7 branches; Tasmania . . . . . ***Grahamina gymnota***

3b Posterior lateral line with 20–24 basally pored scales; supraorbital tentacle with 6–10 branches; New Zealand . . . . . ***Grahamina signata* n. sp.**

4a Anterior lateral line series with 20–26 tubular pored scales; posterior lateral line series with 10–15 pored scales (some notched); first dorsal fin usually plain blackish . . . . . ***Grahamina gymnota***

4b Anterior lateral line series with 17–21 tubular pored scales; posterior lateral line series with 16–27 pored scales (some notched); first dorsal fin usually with a black blotch on the distal posterior part (rarely with a distal dark stripe, plain whitish or plain blackish) . . . . . ***Grahamina capito.***

### 3.3.1. *Grahamina capito* (Jenyns, 1841) (Figs 4–6)

Spotted robust triplefin

*Tripterygion capito* Jenyns, 1841: 94–95, pl. 19, fig. 1 (Bay of Islands, New Zealand). Richardson, 1843: 212 ("crawls over the tidal rocks in the Bay of Islands").

*Tripterygium nigripinne* (non Valenciennes in Cuvier & Valenciennes, 1836): Günther, 1861: 227 [part: New Zealand; some of specimens (a), specimen (b)].

*Tripterygium nigripenne* (non Valenciennes in Cuvier & Valenciennes, 1836): Hutton, 1872: 31.

*Tripterygium jenningsi* Hutton, 1879: 339–340 (Auckland Islands; rock pools). Hardy, 1990: 14 (probable syntype in NMNZ).

*Tripterygion robustum* (non Clarke, 1879): Hutton, 1890: 280. Gill, 1893 (part): 119 (New Zealand). Ruck, 1973: 1–10 (development). Paulin & Stewart, 1985: 51 (New Zealand, widespread, 0–20 m). Hardy, 1989: 491. Roberts, 1991: 33 (Chatham Island).

*Tripterygion varium* (non Forster in Bloch & Schneider, 1801): Waite, 1909: 597–598 (Musgrave Harbour, Auckland Islands). Waite, 1913: 7 (part). Graham, 1938 (part): 416 (Otago Harbour).

*Enneapterygius mortenseni* Rendahl, 1926: 11–12 (part: New Zealand: Queen Charlotte Sound, 3–10 fms). Nielsen, 1974: 74 (type in Zoologisk Museum Copenhagen).

*Tripterygion nigripenne* (non Valenciennes in Cuvier & Valenciennes, 1836): Darby, 1966: 192–195 (part: description, figs 12.8, 12.9).

*Tripterygion nigripenne robustum* (non Clarke, 1879): Darby, 1966: 192–195 (part: description, fig. 12.10).

*Forsterygion nigripenne* (part: non Valenciennes in Cuvier & Valenciennes, 1836): Anderson, 1973: 3, 99 (Leigh; fig.).

*Gilloblennius* (?) sp.: Hardy, 1986: 29 (Snares Islands: Hoho Bay, 15 m).

Undetermined genus and species: Francis, 1988: 51, pl. 123 (part: possibly throughout New Zealand; rock, weed or shell bottom in sheltered bays and estuaries).

*Forsterygion nigripenne robustum* (non Clarke, 1879): Mayr & Berger, 1992: 243–256 (territoriality, microhabitat selection).

*Forsterygion ?robustum* (part: non Clarke, 1879): Paulin & Roberts, 1992: 93–94, figs 45 a, b, pl. 16 D–F (widespread around New Zealand).

## Material

Total: 995 specimens, 20–91 mm SL.

**New Zealand general**: BMNH 1845. 6. 12: 14, 1 spec., before 1845. – BMNH 1973. 6. 28: 7, 4 spec. [these belong to Günther's (1861: 277) specimens (a) of *Tripterygium nigripinne*]. – CAS uncat., 1 spec., J. Ruck, 1976.

**New Zealand, North Island, NE Northland and Hauraki Gulf**: BMNH 1917. 7. 14: 56–57, **syntypes** of *Tripterygion capito*, 2 specimens, 44.7–50.2 mm SL, Bay of Islands, C. Darwin („Beagle" voyage). – NMNZ P. 13552, 4 spec., Bay of Islands. – NMNZ P. 25310, 47 spec., 35°14′S 174°14′E. – NMNZ P. 30175, 3 spec., Waiheke Island. – NMNZ P. 30199, 1 spec., 35°11.8′S 174°03.7′E. – SMF 1828, 3 spec., Hauraki Gulf. – SMNS 13733, 19 spec., 35°24′S 174°12′30″E. – SMNS 13747, 1 spec., 35°15′S 174°10′E. – SMNS 13779, 1 spec., 36°26′S 174°46′E. – SMNS 13785, 22 spec., 36°44′S 175°28′30″E. – SMNS 14131, 11 spec., 36°41′S 175°26′E.

**New Zealand, North Island, W coast**: NMNZ P. 18125, 1 spec., 39°03.6′S 174°01.5′E. – NMNZ P. 18137, 34 spec., 39°03.4′S 174°03.7′E. – NMNZ P. 18140, 80 spec., 39°01′S 174°09′E. – NMNZ P. 24216, 21 spec., Urenui, North Taranaki. – NMNZ P. 24225, 46 spec., New Plymouth.

**New Zealand, North Island, Bay of Plenty**: SMNS 13802, 1 spec., 37°57′S 177°02′E. – SMNS 13810, 12 spec., 37°50′S 177°35′E.

**New Zealand, North Island, East Cape**: NMNZ P. 25278, 1 spec., Hicks Bay.

**New Zealand, North Island, Hawke's Bay**: NMNZ P. 25635, 27 spec., Napier foreshore. – NMNZ P. 30171, 11 spec., Waitotara Reef. – SMNS 13842, 16 spec., Cape Kidnappers.

**New Zealand, North Island, SE Coast**: NMNZ P. 24346, 1 spec., 40°54′S 176°13′E. – NMNZ P. 24361, 2 spec., 40°54′S 176°13′E. – NMNZ P. 24375, 13 spec., Flatpoint.

**New Zealand, North Island, Wellington area**: NMNZ P. 13982, 1 spec., 41°18′S 174°50′E. – NMNZ P. 13975, 11 spec., 41°18′S 174°50′E. – NMNZ P. 14116, 12 spec., 41°18′S 174°50′E. – NMNZ P. 25320, 1 spec., 41°18′S 174°50′E. – NMNZ P. 25437, 67 spec., 41°05′S 174°35′E. – NMNZ P. 25685, 2 spec., 41°21′S 174°46′E. – SMNS 10161, 5 spec., 41°18′S 174°46′E.

**New Zealand, South Island, Golden Bay and Marlborough Sounds**: NMNZ P. 25292, 2 spec., N Nelson. – NMNZ P. 25640, 1 spec., 41°01′S 148°08′E. – NMNZ P. 25668, 1 spec., 41°00′S 173°50′E. – NMNZ P. 25669, 1 spec., 41°05′S 173°48′E. – NMNZ P. 25686, 1 spec., 41°09′S 173°58′E. – NMNZ P. 25687, 1 spec., 41°09′S 173°58′E. – NMNZ P. 25688, 1 spec., 40°59′S 174°04′E. – SMNS 14103, 13 spec., 40°48′S 172°46′E. – SMNS 14504, 1 spec., 40°49′S 172°53′E. – ZMUC P. 76850, 1 spec., 28.2 mm SL, **syntype** of *Enneapterygius mortenseni* Rendahl, 1926, Queen Charlotte Sound, T. Mortensen, 20 Jan. 1915.

**New Zealand, South Island, W coast**: SMNS 14096, 16 spec., Cape Farewell.

**New Zealand, South Island, Canterbury**: NMNZ P. 24362, 9 spec., Limestone Bay.

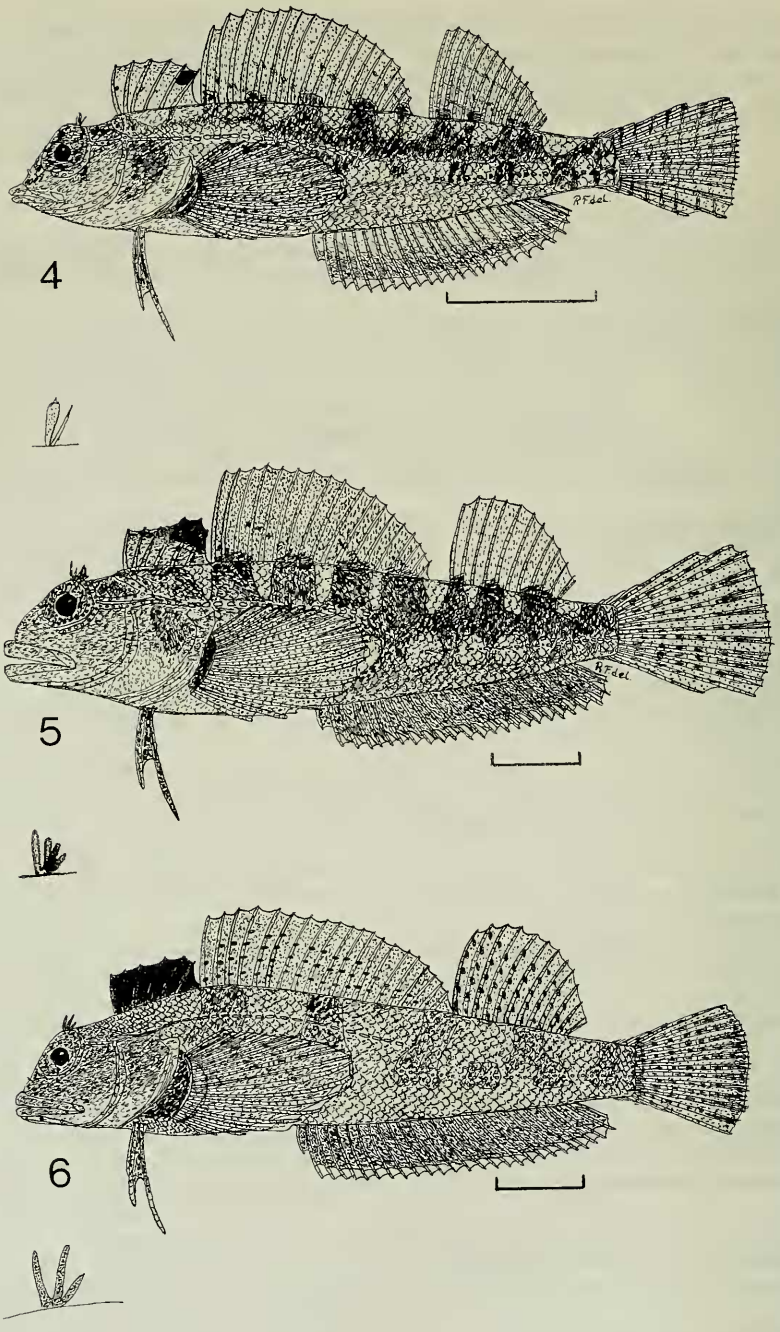
**New Zealand, South Island, Otago**: AMS I. 14772, 10 spec., Otago Harbour. – AMS I. 34135–001, 4 spec., Otago Harbour. – NMNZ P. 10663, 2 spec., Oamaru. – NMNZ P. 13491, 34 spec., Otago Harbour. – SMNS 14050, 42 spec., Otago Harbour.

**New Zealand, South Island, Southland**: SMNS 14036, 7 spec., 46°21′S 167°44′E.

**New Zealand, South Island, Fiordland**: NMNZ P. 16952, 5 spec., Elizabeth Island. – NMNZ P. 16955, 6 spec., Doubtful Sound. – NMNZ P. 19857, 1 spec., Edwardson Sound.

**Stewart Island**: NMNZ P. 24048, 1 spec., 47°11′S 167°38′E. – NMNZ P. 27631, 88 spec., 46°54.2′S 168°08.7′E. – NMNZ P. 27787, 1 spec., 47°06.9′S 168°07.5′E. – NMNZ P. 27809, 27 spec., 46°54.2′S 168°08.7′E. – SMNS 14025, 13 spec., 46°53′55″S 168°08′19″E – 46°54′10″S 168°08′20″E.

**Chatham Islands**: NMNZ P. 25467, 1 spec., 43°57′S 176°33′W. – NMNZ P. 25494, 24 spec., 43°50′S 176°41′W. – NMNZ P. 25519, 37 spec., 44°02′S 176°18′W. – NMNZ P. 26546, 80 spec., 43°44.3′S 176°12′W. – NMNZ P. 25630, 2 spec., 43°57′S 176°33′W.




Figs 4–6. *Grahamina capito* (Jenyns, 1841), New Zealand, North Island; *above*: lateral view; *below*: left supraorbital tentacle (enlarged). – 4. Coromandel Peninsula, SMNS 14131, specimen 1, 40.5 mm SL; – 5. Coromandel Peninsula, SMNS 13785, specimen 1, 68.7 mm SL; – 6. Cape Kidnappers, SMNS 13842, specimen 1, 70.7 mm SL. – Scales indicate 10 mm.

**Auckland Islands**: NMNZ P. 20546, **lectotype** of *Tripterygion jenningsi* Hutton, 1879, 1 specimen, 63.9 mm SL, F. W. Hutton. AMS I. 22222–001, 2 postlarvae, 50°10'S 166°20'E. – BMNH 1901. 11. 8: 90, 1 spec. – BMNH 1906. 5. 8: 76, 1 spec., Laurie Harbour, R/V „Discovery". – NMNZ P. 1435, 5 spec., Carnley Harbour. – NMNZ P. 1440, 2 spec., Hanfield Inlet. – NMNZ P. 1489, 19 spec., Enderby Island. – NMNZ P. 1490, 1 spec., Rose Island. – NMNZ P. 1625, 2 spec., Ranui Cove. – NMNZ P. 20111, 1 spec., Charnley Harbour. – NMNZ P. 20112, 5 spec., Charnley Harbour. – NMNZ P. 25309, 4 spec., Enderby Island. – NMNZ P. 28840, 3 spec., Port Ross. – NMNZ uncat., 15 spec., Ranui Cove.
**Antipodes Islands**: NMNZ P. 17084, 1 spec., 49°40'S 178°45'E.

## Diagnosis

A *Grahamina* with 17–21 tubular pored scales in the anterior lateral line series, 16–27 pored (some notched) scales in the posterior lateral line series, area below first dorsal fin base naked or scaled, supraorbital tentacle usually consisting of two branches, one lobate and one simple, sometimes up to four branches, and first dorsal fin low (longest spine 65–75% of first spine of second dorsal fin) with a distal black blotch on fifth (occasionally fourth to sixth) membrane (or plain black or whitish).

## Description

Counts of the syntypes of *Tripterygion capito*: $D_1$ VI; $D_2$ XXI; $D_3$ xiv, 1; A I, xxiii, 1 (total 25); scale rows 42–44 + 1; lateral line scales 17–20 + 24–26.

General description: $D_1$ V–VIII; $D_2$ XVII–XXIII; $D_3$ x-xvi, 1; A I–II, xx–xxviii, 1 (total 22–31); $P_1$ ii–iii, 5–8, vii–ix (total 16–18); $P_2$ I, ii; C (iv–vii), i–ii, 9–11, i–iii, (iii–vi). Scale rows 42–48 + 1–2. Transverse scale rows 7–11 + 3–5 + 7–13. Lateral line scales 17–21 (–23) + 16–27. Mandibular pore formula 2–3 + 1(–2) + 2–3.

Head length 236–294. Eye diameter 73–94. Supraorbital tentacle consisting of two to four branches, length of longest 14–33. Interorbital distance 25–42. Preorbital length 43–58. Body depth 183–255. Body width 138–185. Head width 178–236. Lateral line consisting of an anterior series of 17–21 (–23) tubular pored scales, reaching about to below 14th–15th membrane of second dorsal fin; continuing 3–5 rows lower with a series of 16–27 scales (northern specimens: 16–21; southern specimens: 20–27) bearing a pore in their anterior section (0–21 scales notched posteriorly in larger specimens). Either a scaleless strip below base of first dorsal fin (Figs 4–5), or scaled to posttemporal lateral line branch (Fig. 6). Belly naked, or scaled to an area behind pectoral fin base. Caudal peduncle length 84–131. Caudal peduncle depth 77–89. Maximum observed SL 94 mm.

First dorsal fin low, lower than second dorsal fin; first spine 65–90, third spine 61–101, fourth spine 60–94, penultimate spine 62–98, last spine 46–92. Predorsal (1) length 178–209. First spine of second dorsal fin 109–162, 5th spine 129–172. Predorsal (2) length 313–343. First ray of third dorsal fin 123–177. Preodorsal (3) length 678–729. 5th anal fin ray 73–113, penultimate ray 71–118. Preanal fin length 455–534. Pectoral fin length 231–275. First ray of pelvic fin 108–148, 2nd ray 149–201. Prepelvic fin length 202–242. Caudal fin length 170–242.

Colour in alcohol: Head and body brown, back with 10–11 whitish blotches, sides of body with a row of about 5–6 whitish blotches. Sides of body often with about 5 dark brown cross bands reaching to level of posterior lateral line section. Eye dark grey. Pectoral fin base may be blackish, occasionally with a distal whitish margin. First dorsal fin brownish, membrane between penultimate and last spine

distally with a black blotch, which may continue with an indistinct brownish streak anteriorly; in large specimens black blotch on two or three membranes (Fig. 5 B), occasionally plain whitish or black. Second and third dorsal fin basally with dark brown blotches and basal spotted streaks. Anal fin distally dark brown or dark grey, tips of fin rays whitish. Caudal fin with faint vertical dusky streaks and whitish blotches, distal margin may be blackish. Pectoral fin dusky, tips of lower rays whitish, upper half with irregular vertical bands of dark brown spots. Pelvic fin dark grey, tips of fin rays whitish.

Colour in life (after FRANCIS, 1988: pl. 123; personal observation RF): Head and body yellowish, whitish or brownish grey, with darker grey spots and mottlings. Scales on back may be bordered with blue. Dorsal, caudal and pectoral fin membranes translucent, rays with reddish brown and dark grey spots; anal fin reddish brown, tips of fin rays whitish. Pelvic fin white.

Sexual dimorphism: Large males tend to be overall darker than females and small males.

Intraspecific variation: *Grahamina capito* expresses a significant north-south variation in dorsal and anal fin ray counts, lateral line and total lateral scale rows counts. These counts are higher in southern specimens. Considering the counts of the three dorsal fins together, South Island specimens have 1 more ray than north-eastern North Island specimens; Auckland Islands specimens even have a mean of more than 2.5 more dorsal spines and rays, one more scale in the lateral line, and nearly two more total lateral scale rows than NE North Island specimens.

Some variability is found in first dorsal fin coloration in large specimens from Otago Harbour (SMNS 14050) and Southland (SMNS 14036); the fin may be mostly blackish or plain whitish in some specimens, while others show the characteristic black blotch. Several larger specimens from Coromandel Peninsula (SMNS 13785), Auckland Islands and other areas have the lobate section of the orbital tentacle split into up to three separate tips, making a total of 4 branches on the orbital tentacle (Fig. 5); these specimens, however, agree otherwise with normal specimens of *Grahamina capito*. Some populations were found having four branches on the orbital tentacle in all specimens.

Specimens may either have a scaled or scaleless nape and posterior belly; specimens with a scaled nape usually have lower vertical fins.

## Distribution

Throughout New Zealand, from Northland to Southland, including Stewart Island. Also Chatham, Auckland and Antipodes Islands. The species is found in sheltered marine rock pools and upper subtidal areas.

## Relationships

*Grahamina capito* is closely related to *G. nigripenne*, but is distinguished by the much lower first dorsal fin (posteriorly elevated in *G. nigripenne*, higher than first spine of first dorsal fin), the colour pattern of the first dorsal fin (distal one-third black in *G. nigripenne*), the number of tubular pored scales in the anterior lateral line series (13–16 in *G. nigripenne*), and the shape of the supraorbital tentacle (simple in *G. nigripenne*). From other species with a naked back below the first dorsal fin, *G. capito* differs in the colouration of the first dorsal fin (black in *G. gymnota* and *G. signata*), and the structure of the suborbital and postorbital lateral line canals

(double in *G. gymnota* and *G. signata*, suborbital branch disconnected from preopercular and postorbital branches; if (rarely) double in *G. capito*, connected with preopercular and postorbital branches).

## Remarks

The original description of *Tripterygion capito* by JENYNS (1841) agrees well with the common species inhabiting tidal pools that is here assigned to the name. The characters distinguishing it from *G. nigripenne* are shown in the excellent original description and illustration (JENYNS, 1841, pl. 19, fig. 1), i. e. the lower first dorsal fin, the longer lateral line (18 in the syntype illustrated by JENYNS), and the colouration (e. g. spotted second dorsal fin). Other characters, like fin ray counts, agree well with the range found in Bay of Islands specimens.

The species known for some time under the name *Tripterygion capito* or *Forsterygion capito* (non Jenyns, 1841) (RUCK, 1973: 1–10; AYLING, 1982: 280, pl. 40; PAULIN & STEWART, 1985: 50; ROBERTS, WARD & FRANCIS, 1986: 358) was described by HARDY (1989) as a new species, *Forsterygion lapillum*.

*Tripterygium jenningsi* was described by HUTTON (1879) from the Auckland Islands. HARDY (1990: 14) discussed the identity of a specimen probably originating from the Otago Museum, Dunedin. This specimen (now NMNZ P. 20546) agrees well with the common Auckland Islands species of *Grahamina*, is almost certainly a HUTTON specimen, and is hereby designated as the **lectotype** of *Tripterygium jenningsi* Hutton, 1879. It was found in a jar containing a syntype of *Notothenia parva* Hutton, 1879, also from Auckland Islands, which was described in the same paper; he considered the specimen a possible syntype. The common Auckland Islands *Grahamina* belongs to the same species as New Zealand mainland *Grahamina capito*, and is therefore synonymized. *Grahamia capito* is ecologically well separated from the closely allied *G. nigripenne*, as it exclusively occurs in marine intertidal and subtidal habitats, while *G. nigripenne* is found in estuaries and lower rivers (brackish and fresh water).

*Grahamina capito* is a relatively variable species. Smaller specimens usually have the characteristic color pattern of Fig. 4, but some larger specimens may have a larger black spot in the first dorsal fin, a distal dark streak, or a plain whitish or blackish first dorsal fin (like some Southland specimens, Fig. 5). The supraorbital tentacle usually consists of one leaflike and another thin branch, but the leaflike structure may be split up into up to four branches in large specimens (Fig. 6). In this case, the anteriormost branch is longest and the other branches descrease in length posteriorly (while *G. signata* always has the middle branch longest, and the other branches decreasing in length on both sides).

*Grahamia capito* has a naked strip below the base of the first dorsal fin, but some specimens may have small scales or be fully scaled, and some even have it normally scaled, the scales reaching to the posttemporal lateral line branch (Fig. 6).

At the Chatham Islands, specimens intermediate between *Grahamina capito* and *G. signata* have been found (NMNZ P. 21074, NMNZ P. 25494, NMNZ P. 26640, NMNZ P. 26658, NMNZ P. 26764); in most aspects they look like *G. capito*, but the supraorbital tentacle has 4–7 branches, and a shape which is similar to *G. signata*. The Chatham Islands, therefore, seem to be an area where *G. capito* and *G. signata* hybridize. In all other areas, including mainland New Zealand, populations of *G. capito* and *G. signata* are clearly separated.

### 3.3.2. *Grahamina gymnota* (Scott, 1977) (Fig. 7)
Tasmanian robust triplefin

*Forsterygion gymnotum* Scott, 1977: 158–161, fig. 3 (Montague Bay, SE Tasmania). Last, Scott & Talbot, 1983: 428–429, fig. 30.99 (southeastern Tasmania; mainly shallow, rocky areas in large estuaries and bays; common around wharves and piers in Derwent Estuary near Hobart).

#### Material

(Total: 16 specimens, 39–79 mm SL).
**Australia, Tasmania**: QVMT 1976/5/204, **holotype**, 62.5 mm SL, Montagu Bay. – AMS I. 20105–001, **paratype**, 1 spec., 63.0 mm SL, same data as the holotype. – BMNH 1978. 3.3:1, **paratype**, 1 spec., 67.0 mm SL, same data as the holotype. – QVMT 1976/5/205–206, **paratypes**, 2 spec., 53.7–55.9 mm SL, same data as the holotype. – TMH D. 1310, **paratype**, 1 spec., 61.9 mm SL, same data as the holotype. – NMNZ P. 25422, 3 spec., 39–42 mm SL, 42°30′S 147°55′E. – NMNZ P. 25423, 2 spec., (C & S), Kettering Jetty. – NMNZ P. 30579, 3 spec., West Point, Derwent River estuary. – NMNZ P. 30580, 2 spec., West Point, Derwent River estuary.

#### Diagnosis

A *Grahamina* with 20–26 pored scales in the anterior lateral line series, 10–15 notched scales in the posterior lateral line series, nape naked, supraorbital tentacle consisting of 3–7 branches, and first dorsal fin low, about half a high as second dorsal fin, plain black to dusky with a black blotch posteriorly.

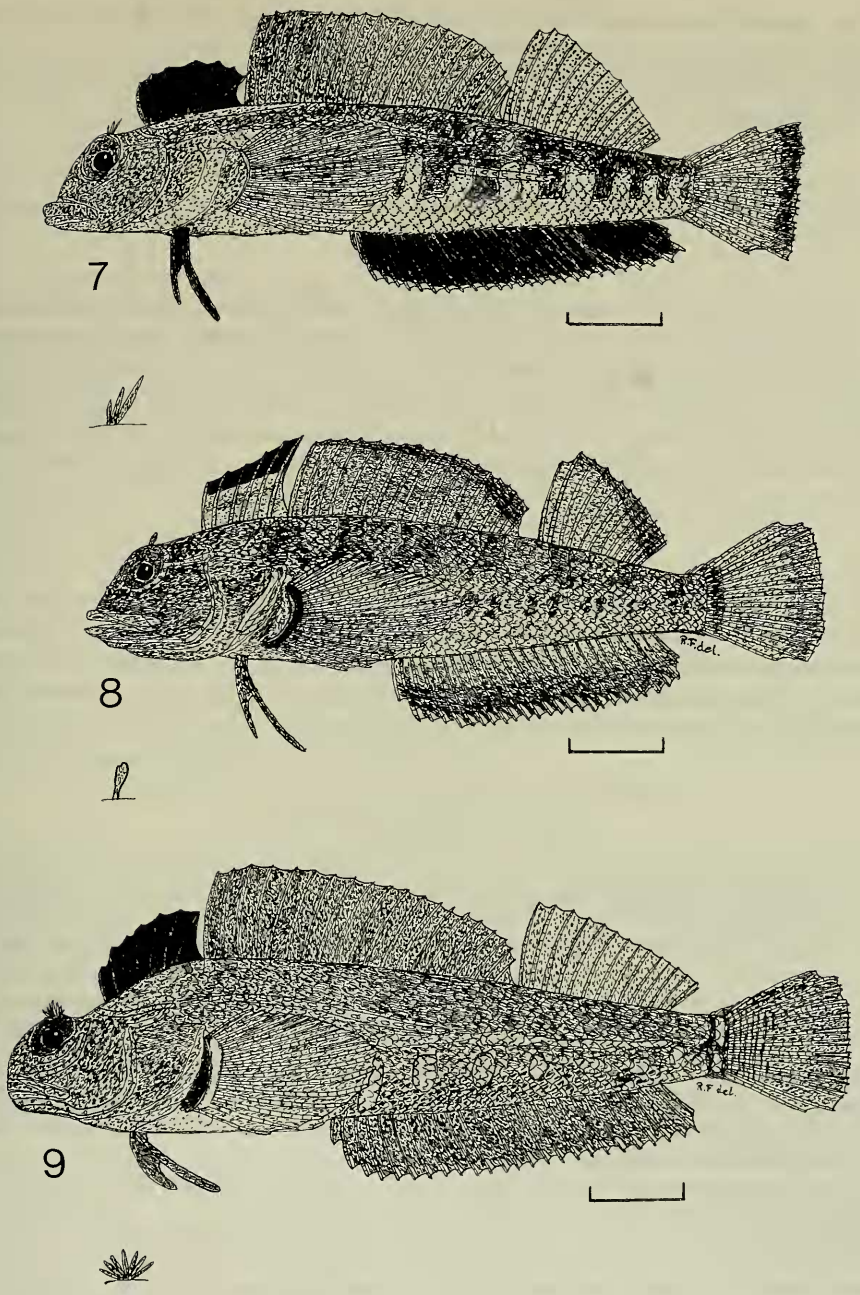
#### Description

$D_1$ VI–VIII; $D_2$ XVIII–XXIV; $D_3$ x–xv, 1; A I–II, xxii–xxvi, 1 (total 25–29); $P_1$ ii–iii, 6–8, viii (total 17–18); $P_2$ I, ii; C (iv), ii, 9, ii, (iv). Scale rows 44–50 + 2. Transverse scale rows 7 + 3 + 10. Lateral line scales 20–26 + 10–18. Mandibular pore formula 5 + 1 + 5.

Head length 243–247. Eye diameter 69–79. Supraorbital tentacle with 3–7 tips, the posteriormost longest, its length 24–37. Interorbital distance 27–41. Preorbital length 59–61. Body depth 203–230. Body width 145–164. Lateral line consisting of an anterior series of 21–26 tubular pored scales, reaching about to 21st spine of second dorsal fin; continuing three rows lower with a series of 10–18 notched scales. A scaleless strip below bases of first and anterior part of second dorsal fin, reaching back to sixth spine of second dorsal fin. Caudal peduncle length 76–84. Caudal peduncle depth 79–92. Maximum observed SL 67 mm.

First dorsal fin distally convex, about half as high as second dorsal fin; first spine 73–96, third spine 84–108, fourth spine 98–115, penultimate spine 75–97, last spine 68–76. Predorsal (1) length 181–183. First spine of second dorsal fin 148–164, 5th spine 152–166, last spine 47–57. Predorsal (2) length 318–323. First ray of third dorsal fin 146–154. Predorsal (3) length 689–709. 5th anal fin ray 94–118, penultimate ray 92–104. Preanal fin length 461–467. Pectoral fin length 248–264. First ray of pelvic fin 118–150, 2nd ray 154–169. Prepelvic fin length 191–223. Caudal fin length 170–207.

Colour in alcohol: Head and body dark brown, sides of body with vertical dark brown streaks, belly lighter. Eye dark grey. First dorsal fin black or dark with a black blotch on posterior membranes (two small specimens, NMNZ P. 25422 and NMNZ P. 30580), second and third dorsal fins dark brown. Anal fin blackish, tips of




Figs 7–9. Lateral view (*above*) and left supraorbital tentacle (enlarged) of species of *Grahamina* new genus. – 7. *G. gymnota* (Scott, 1977); Australia, southeastern Tasmania, BM(NH) 1978. 3. 3: 1, male, 67.0 mm SL, paratype; – 8. *G. nigripenne* (Valenciennes, 1836); New Zealand, Northland, SMNS 9893, specimen 1, male, 64.3 mm SL; – 9. *G. signata* new species; New Zealand, South-Westland, NMNZ P. 30569, male, 76.0 mm SL, holotype. – Scales indicate 10 mm.

fin rays white. Caudal fin dark brown, distally dark grey. Pelvic fin blackish. Pectoral fin dark brown, central parts dark grey.

Sexual dimorphism: Not much developed. Large males tend to be overall darker than small males and females.

### Distribution

Known only from rocky bays and estuaries of southeastern Tasmania, Australia.

### Relationships

*Grahamia gymnota* is compared with the most closely allied species, *G. signata*, in the "relationships" section of that species. It is distinguished from the other species of the genus by the structure of the suborbital and postorbital lateral line canals (simple in *G. capito* and *G. nigripenne*, suborbital canal connected with postorbital and preopercular canals), the coloration of the first dorsal fin (only distally black in *G. capito* and *G. nigripenne*), and the number of branches of the supraorbital tentacle (usually 1–2 in *G. capito* and *G. nigripenne*).

### Remarks

This species is of zoogeographical importance, as it represents one of at least three triplefin links between New Zealand and southern Australia. Other triplefin links are *Forsterygion varium*, which has a conspecific population in southeastern Tasmania (Hardy, 1989), and an undescribed New Zealand species of *Apopterygion* of New Zealand whose sister-species is *A. alta* of southern Australia.

## 3.3.3. *Grahamina nigripenne* (Valenciennes, 1836) (Fig. 8)

Estuarine Triplefin, Cockabully

*Tripterygion nigripenne* Valenciennes in Cuvier & Valenciennes, 1836: 413–414, pl. 339 (les rivières de la Nouvelle-Zélande). Hutton, 1877: 354 (New Zealand; "this is the same as *Blennius varius*, Forster"). Hutton, 1904: 46 (New Zealand). Waite, 1907: 32. Darby, 1966: 192–195 (part: description, fig. 12.7). McDowall, 1978: 146, fig. 16.1 (description, biology; estuaries and rocky shores on open coasts, bays, harbours . . . throughout New Zealand). McDowall, 1990: 292, fig. 17.1, pl. 67 (description, biology: estuaries and rocky shores on open coasts, bays, harbours . . . throughout New Zealand).

*Tripterygion nigripinne*: Richardson, 1843: 211 (rivers; New Zealand).

*Tripterygium nigripinne*: Günther, 1861: 277 (part: New Zealand; some of specimens a.).

*Tripterygium nigripenne* (non Valenciennes in Cuvier & Valenciennes, 1836): Hutton, 1872: 31 (Wellington Harbour).

*Tripterygion varium* (non Forster in Bloch & Schneider, 1801): Waite, 1913: 7 (part).

*Enneapterygius varius*: Rendahl, 1926: 10 (part: Stewart Island).

*Tripterigion* sp.: Woods, 1963: 47 (New Zealand: mouths of rivers and streams).

*Forsterygion nigripenne*: Anderson, 1973: 3 (part: Leigh).

*Forsterygion* sp.: Paulin et alii, 1989: 220 (New Zealand; in key).

*Forsterygion ?nigripinne*: Paulin & Roberts, 1992: 91–92, figs 44 a, b, pl. 16 A–C (widespread around New Zealand, from Northland to Stewart Island and Chatham Islands; predominantly in estuarine areas).

### Material

Total: 895 specimens, 20–80 mm SL.

**New Zealand general**: MNHN A. 2153, **holotype** of *Tripterygion nigripenne*, 65.3 mm SL, les rivières de la Nouvelle-Zélande (rivers of New Zealand), Lesson & Garnot. – BMNH

1848. 3. 18: 144–146, 3 spec. – BMNH 1973. 6. 28: 8–18, 25 spec.; these belong to GÜNTHER's (1861: 277) specimens (a) of *Tripterygium nigripinne*.
**New Zealand, North Island, eastern Northland and Hauraki Gulf**: NMNZ P. 15252, 82 spec., 35°01'S 173°43.5'E. – NMNZ P. 15303, 30 spec., 35°18'S 174°06'E. – NMNZ P. 28029, 1 spec., 35°16°S 174°05'E. – NMNZ P. 15220, 1 spec., 35°11.8'S 174°03.7'E. – SMNS 9889, 4 spec., 35°18'S 174°07'E. – SMNS 9893, 17 spec., 34°29'S 172°43'E.
**New Zealand, North Island, Wellington area**: NMNZ P. 25439, 3 spec., 40°52'S 175°01'E.
**New Zealand, South Island, Golden Bay and Marlborough Sounds**: NMNZ P. 17542, 8 spec., 41°18'S 173°09'E. – NMNZ P. 24585, 1 spec., 40°74'S 173°53.5'E. – NMNZ P. 25274, 4 spec., Nelson.
**New Zealand, South Island, Otago**: NMNZ P. 10664, 2 spec., Oamaru, 45°11'S 170°54'E.
**New Zealand, South Island, W coast**: NMNZ P. 25347, 7 spec., Okuru.
**New Zealand, South Island, Fiordland**: NMNZ P. 16944, 2 spec., Doubtful Sound. – NMNZ P. 19921, 49 spec., Long Sound. – NMNZ P. 16957, 6 spec., Doubtful Sound. – NMNZ P. 16963, 5 spec., Bradshaw Sound. – NMNZ P. 21054, 164 spec., Charles Sound. – NMNZ P. 21058, 12 spec., Mid-Southerland Sound. – NMNZ P. 30182, 1 spec., Doubtful Sound. – NMNZ P. 30183, 1 spec., Doubtful Sound.
**Stewart Island**: NMNZ P. 27830, 316 spec., 46°53.7'S 168°07.5'E. – ZMUC P. CN 4, 1 spec., Paterson Inlet, T. MORTENSEN, 18 Nov. 1914.
**Chatham Islands**: NMNZ P. 26506, 4 spec., 43°42.9'S 176°28.5'W. – NMNZ P. 26677, 145 spec., 43°46.2'S 176°33.6'W.

## Diagnosis

A *Grahamina* with 13–16 (–17) pored scales in the anterior lateral line series, 23–31 basally pored scales in the posterior lateral line series, nape naked, supraorbital tentacle simple, and first dorsal fin high (its last spines longer than first spines of second dorsal fin), the distal one-third black.

## Description

Description of holotype: $D_1$ VI; $D_2$ XIX; $D_3$ xii, 1; A II, xxiii, 1 (total 26); $P_1$ ii, 8, viii (total 18); $P_2$ I, ii; C (v), ii, 9, ii, (iv). Scale rows 40 + 2. Transverse scale rows 9 + 9. Lateral line scales 15–17 + 23–24. Mandibular pore formula 2 + 1 + 2. Naked strip under base of first dorsal fin.

General description: $D_1$ V–VII; $D_2$ XVI–XX; $D_3$ xi–xiii, 1; A I–II, xx–xxv, 1 (total 22–28); $P_1$ ii, 6–8, vii–viii (total 16–17); $P_2$ I, ii; C (iii–v), ii, 9, ii, (iii–v). Scale rows 38–47 + 2–3. Transverse scale rows 9–12 + 3–4 + 10–13. Lateral line scales 13–17 + 23–31. Mandibular pore formula 2–3 + 1 + 2–3.

Head length 259–277. Eye diameter 75–79. Supraorbital tentacle lobate, simple, occasionally with a short anterior branch, its length 12–16. Interorbital distance 35–40. Preorbital length 66–74. Body depth 220–246. Body width 166–179. Head width 203–226. Lateral line consisting of an anterior series of 13–17 tubular pored scales, reaching about to below 10th–11th membranes of second dorsal fin; continuing 4 rows lower with a row of 23–31 pores on the basal part of scales (scales not notched). A scaleless strip below base of first dorsal fin. Caudal peduncle length 89–112. Caudal peduncle depth 92–101. Maximum observed SL 80 mm.

First dorsal fin high, last spines longer than first spines of second dorsal fin; first spine 81–88, third spine 85–119, penultimate spine 106–157, last spine 118–163. Predorsal (1) length 195–213. First spine of second dorsal fin 116–142, 5th spine 137–195, last spine 43–58. Predorsal (2) length 319–355. First ray of third dorsal fin 128–140. Predorsal (3) length 696–740. 5th anal fin ray 97–148, penultimate ray

46–89. Preanal fin length 466–498. Pectoral fin length 267–280. First ray of pelvic fin 110–146, 2nd ray 164–185. Prepelvic fin length 203–251. Caudal fin length 178–200.

Colour in alcohol: Head and body dark brown or dark grey, in smaller specimens lighter. Eye dark grey. Back with indistinct (small specimens: distinct) vertical dark brown bars, sides of body with a row of about 6 pairs of dark brown spots. Belly light brown. First dorsal fin brownish, distal one-third black. Second and third dorsal fins dark brown, distal margin blackish, black margin widening caudally. Anal fin distally dark brown, basally lighter, tips of fin rays whitish. Caudal fin with a basal dark brown band, distally dark grey, rays and membranes greyish brown. Pelvic fin dark grey. Pectoral fin with a basal blackish band, membranes greyish brown, lower half darker.

Sexual dimorphism: Large males are overall darker with larger dorsal fins than females an small males.

### Distribution

Throughout New Zealand and at Chatham Island, common to very abundant in estuaries and lower reaches of rivers and streams (fresh and brackish water), and may extend onto rocky shores with freshwater run-off. This species also occurs in the brackish "freshwater layer" in the southwestern fiords of Fiordland.

### Relationships

*Grahamina nigripenne* is most closely allied to *G. capito* (see below). It is distinguished from other congenerics with a naked area below the first dorsal fin by coloration of the first dorsal fin (black in adult *G. gymnota* and *G. signata*), a high first dorsal fin, and fewer lateral line scales (17–26 in other species).

### Remarks

The holotype of this species was examined; it shows all characters of the estuarine species, including a high first dorsal fin, simple head lateral line canals, the naked strip under the first dorsal fin base, few anterior lateral line pores, etc.

*Tripterygion nigripenne* (non Valenciennes in Cuvier & Valenciennes, 1836) of Waite (1904a, 1904b) is based on misidentified specimens of *Norfolkia squamiceps* (McCulloch & Waite, 1916).

## 3.3.4. *Grahamina signata* new species (Fig. 9)

Multi-tentacled robust triplefin

### Material

(Total: 174 specimens, 21–91 mm SL).

**New Zealand, South Island, West Coast: Holotype:** NMNZ P. 30571, 76.0 mm SL, Tauranga Bay, S side, opposite seal colony, 3 km SSW Cape Foulwind, 15 km WSW Westport, 41°47′S 171°27′E, rock pools and 0–1.5 m depth, rocks, sand and algae, exposed area, R. Fricke, 21 Nov. 1992. – **Paratypes:** AMS I. 34234–001, 5 spec., 30–61 mm SL, same data as the holotype. – BMNH 1993. 9. 24: 1–5, 5 spec., 35–60 mm SL, same data as the holotype. – NMNZ P. 30570, 5 spec., 25–65 mm SL, same data as the holotype. – SMNS 13916, 66 spec., 21.3–73.0 SL, same data as the holotype. – SMNS 13933, 21 spec., 25.7–69.1 mm SL, rocks 3 km SW Barrytown, S side of long sandy beach, 20 km NNE Grey-

mouth, 42°15'S 171°16'E, rock pools and 0–3.5 m depth, rocks, sand and algae, exposed area, R. Fricke, 22 Nov. 1992. – USNM 326614, 5 specimens, 22–55 mm SL, same data as the holotype.
**New Zealand, South Island, Otago: Paratype**: SMNS 14047, 1 spec., 43.8 mm SL, Allan Beach, Otago Peninsula, rocks at E side, 2 km W Cape Saunders, 45°54'S 170°42'E, rock pools at low tide, rocks, algae, R. Fricke, 4 Dec. 1992.
**New Zealand, North Island, NE Northland and Hauraki Gulf**: Other material : NMNZ P. 25282, 1 spec., 35°16'S 174°05'E.
**New Zealand, North Island, W Northland**: Other material: NMNZ P. 13557, 4 spec., 36°50'S 174°26'E. – SMNS 9915, 3 spec., 35°35'S 173°21'E. – SMNS 13739, 1 spec., 35°35'S 173°21'E.
**New Zealand, North Island, W Coast**: Other material: NMNZ P. 17082, 3 spec., New Plymouth. – NMNZ P. 30176, 3 spec., Kapiti Island.
**New Zealand, North Island, Hawke Bay**: Other material: NMNZ P. 24347, 10 spec., Napier.
**New Zealand, North Island, Wellington area: Paratypes**: NMNZ P. 14109, 2 spec., 83.6–88.2 mm SL, Scorching Bay, 41°18'S 174°50'E, 5 m depth, A. Stewart & G. S. Hardy, 14 June 1983. – Other material: NMNZ P. 25364, 20 spec., „Waihine" wreckage, Wellington Harbour entrance, 41°21'S 174°50'E, 12 m depth, F. Clino, 17 Sep. 1973. – NMNZ P. 26014, 1 spec., 52 mm SL, Makara Beach, N of river mouth, 41°19'S 175°28'E, 0–4 m depth, G. Hardy, 26 Feb. 1983.
**Antipodes Islands: Paratypes**: NMNZ P. 17083, 17 spec., 52.1–90,7 mm SL, Anchorage Bay, 5 m deep pool, New Zealand Oceanographic Institute, 8 Mar. 1985.

## Etymology

The species name "*signata*" (Latin) means marked by a sign; the name refers to the black-and-white marking on the pectoral fin base.

## Diagnosis

A *Grahamina* with 19–24 pored scales in the anterior lateral line series, 20–24 basally pord scales in the posterior lateral line series, nape naked, supraorbital tentacle with 6–10 branches, first dorsal fin low (longest spine 55–75% of first spine of second dorsal fin), plain black, and pectoral fin base with a black and a white band.

## Description

$D_1$ VII (VI–VII); $D_2$ XX (XIX–XXIII); $D_3$ xiii, 1 (xi–xvi, 1); A I, xxiv, 1 (total 26) (I, xxi–xxvi, 1, total 23–28); $P_1$, i–ii, 6–7, viii (total 16) (i–iii, 6–7, viii–ix, total 15–18); $P_2$ I, ii (I, ii); C (vii), ii, 9, ii, (vi) [(iii–vii), ii, 9, ii, (ii–vi)]. Total lateral scale rows 45–46 (44–48). Transverse scale rows 6 + 19 (6–8 + 17–24). Lateral line scales 22 + 23–24 (19–24 + 20–24). Mandibular pore formula 3 + 1 + 3 (3 + 1 + 3).

Head length 242 (215–249). Eye diameter 62 (69–94). Supraorbital tentacle with 6–10 tips, the longest (median) 22 (26) (Fig. 9). Interorbital distance 29 (29–37). Preorbital length 49 (46–59). Body depth 240 (206–274). Body width 174 (157–206). Head width 224 (152–241). Lateral line consisting of 19–24 tubular pored scales, reaching about to below 16th spine of second dorsal fin. Usually with a row of up to 24 pores on basal portions of scales (no posteriorly incised scales!), starting 4 rows below end of anterior section. A scaleless strip below base of first dorsal fin, occasionally also under anterior section of base of second dorsal fin. Caudal peduncle length 72 (70–107). Caudal peduncle depth 84 (75–90). Maximum observed SL 90.7 mm.

First dorsal fin relatively low, longest spine 55–75% of length of first $D_2$ spine; first spine 51 (50–88), third spine 72 (70–92), spine before penultimate 84 (78–96), penultimate spine 82 (74–88), last spine 78 (63–81). Predorsal (1) length 174 (170–213). First spine of second dorsal fin 126 (111–160), 5th spine 133 (125–165), last spine 42 (41–58). Predorsal (2) length 317 (296–335). First ray of third dorsal fin 120 (106–157). Predorsal (3) length 728 (685–737). 5th anal fin ray 70 (72–92), penultimate ray 93 (67–112). Preanal fin length 451 (447–487). Pectoral fin length 230 (226–264). First ray of pelvic fin 101 (103–132), 2nd ray 138 (138–170). Prepelvic fin length 180 (172–224). Caudal fin length 167 (164–188).

Colour in alcohol: Head and body dark brown to blackish, belly whitish. Sides of body with a ventral row of white blotches. Smaller specimens with vertical dark stripes between the white blotches, and with numerous whitish spots dorsally. Caudal peduncle with two light blotches. First dorsal fin plain black. Second dorsal fin black or dark grey, third dorsal fin light brownish grey, in smaller specimens occasionally stripes or with small dark spots. Anal fin dark grey, tips of fin rays white or bluish. Pelvic fin dark grey. Pectoral fin greyish brown, pectoral fin base with a black and a white vertical band. Caudal fin greyish brown, median basal rays with faint vertical dark lines.

Sexual dimorphism: Not much developed; large males appear to be overall darker than females and small males.

## Distribution

This new species is distributed around New Zealand; it was mostly found on the exposed west coast, being very common in South-Westland. Single specimens are known from New Zealand's east coasts, the Chatham Islands (here, populations were found mixing with *Grahamina capito*; these were not included in the type series) and Antipodes Islands. Probably more widespread, but difficult to collect. The species lives in extremely exposed areas of rocky shores, at depths of 0.3–3 m, and is locally common; occasionally also in exposed rock pools.

## Relationships

*Grahamia signata* n. sp. is most similar to *G. gymnota* of Tasmania, but is distinguished by the posterior lateral line (10–15 notched scales in *G. gymnota*), the number of branches of the supraorbital tentacle (3–7 in *G. gymnota*), and the coloration of the pectoral fin base (brown in *G. gymnota*, without black and white streaks). It is distinguished from other species with a naked area below the first dorsal fin base, by the structure of the suborbital and postorbital lateral line canals (simple in *G. capito* and *G. nigripenne*, suborbital canal connected with postorbital and preopercular canals), the coloration of the first dorsal fin (only distally black in *G. capito* and *G. nigripenne*), and the number of branches of the supraorbital tentacle (1–2 in *G. capito* and *G. nigripenne*).

## Remarks

Small specimens from the west coast of Northland (mouth of Hokianga Harbour) agree well with specimens from South-Westland populations in the structure of the supraorbital tentacle, in counts and coloration, but some specimens have a black blotch on the last membranes of the first dorsal fin (like *G. capito*).

The distribution of this new species is very similar to that of *Blennodon dorsale* (Clarke, 1879), as it is most common in extremely exposed upper subtidal areas. During a 1992 collecting trip by the senior author to New Zealand's south Westland, both species were found co-occurring and locally very common.

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